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LOCAL ANESTHESIA IN THE REDUCTION OF CLOSED FRACTURES AND DISLOCATIONS*

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In perusing the literature pertaining to local anesthesia we find that Conway[1] in 1885 first used cocaine anesthesia with favorable results in the reduction of fractures in three cases of colles and one of posterior dislocation of both bones of the elbow. Lerda[2] in 1907, Quenu[3] in 1908, injected cocaine into the fragmented ends so that the bone marrow, periosteum and surrounding tissues were infiltrated. They reported favorable results and recommended its use more extensively. In 1913 Dollinger[4] and Braun[5], working independently, used procaine hydrochloride anesthesia locally for reduction of fractures. They reported excellent results and were of the opinion that the dangers of infection in the infiltration method were not to be feared. In 1921, Fulton[6] and Hagenbach,[7] working independently, used procaine hydrochloride 1 per cent by infiltration in fractures of the extremities, obtaining satisfactory results. Then Farr,[8] in 1922, reports injection of procaine dissolved in Ringer's solution and combined with a proper proportion of adrenalin, does not, according to him, devitalize the tissues or appreciably delay healing. He reduces practically all fractures and dislocations under the local method. Frostell,[9] in 1925, used 1 per cent procaine, injecting from 3 to 20 cc. directly into the fracture gap. In 1926, Ira Cohen[10] used procaine according to the local infiltration method, injecting between and around the fragments and into the surrounding muscles. He obtained excellent results in all his cases and advocated it as a very practical method. In 1928, Rice[11] gives a most complete and interesting report of his experiences in the use of 1 per cent procaine hydrochloride as a local anesthesia in the reduction of fractures of the lower forearm. He reported having treated over fifty cases in this manner with excellent results.

During the fall of 1927, I had the pleasure of visiting the very interesting clinic of Professor Lorenz Böhler, director of the Emergency Hospital in Vienna. He has been using local anesthesia for several years successfully and routinely in all closed fractures and dislocations. From the number of cases seen during my visit there, I would say conservatively, he will handle 700 to 1,000 cases a year under this procedure.

Rice[11] states: "In view of the experiences of these men, it is evident the use of local anesthesia in the reduction of fractures is by no means a new procedure, nor is it used as extensively as its simplicity and practical application should warrant."

The advantages of local anesthesia:

(1) The ease with which it can be inducted.

(2) No medical assistant, as a rule, is needed.

(3) No expensive equipment is required.

(4) Anesthesia maintained for several hours.

(5) Reduction of fracture first trial not complete—remove cast and manipulate fracture until satisfactory result is obtained.

(6) General anesthesia presents the same contraindications to its use in fractures as it does in any other condition in which anesthesia is a desirable feature. The tendency, too, is to consider the first reduction good enough, usually because of the dread of further general anesthesia.

(7) No danger of inhalation pneumonia or asphyxia as sometimes happens with general anesthesia.

Technique of Procedure

Morphine sulphate gr. ⅛ to ¼ in 2 c.c. 50% magnesium sulphate is given hypodermically to cases with severe pain, extensive fractures and those who are highly nervous. Then the skin over the location of the fracture or dislocation is cleansed with gasoline or soap and water, followed by ether or 70% alcohol—paint skin with 3½% iodine—sterile towels to be placed around the area where injection is to be made. Novocaine 2% with or without adrenalin. About 20 cc. for ordinary fracture or joint; 2 10 cc. syringes boiled, or may be left in 75% alcohol between cases; 2 sterile needles 2½ inches long and 26 gage, also 2 sterile forceps. Never touch needle with fingers. Inject directly into fracture site, even if it extends into a joint. The

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greater the dislocation and hematoma the quicker the anesthetic spreads, and vice versa. In dislocations inject directly into the joint, *e. g.*, shoulder, hip, knee, elbow, fingers. Anesthesia present in 6 to 10 minutes or less, muscular relaxation in about 15 minutes, frequently less, and lasts for several hours, so that if X-ray after reduction is unsatisfactory, it may be repeated even four times in succession, without new anesthetic. There is slight temporary pain from the injection.

When the needle is inserted into the hematoma blood may well up into the syringe; this is readily differentiated from venous or arterial blood by its dull, faded-out appearance and also by the fact that it will continue to rise in the syringe as the needle is inserted farther or withdrawn. It is essential to reach the hematoma in order to have a thorough distribution of the novocaine around the fragmented ends of the bone.

There may be an objection or a question brought up about the possibility of infection in this procedure; in my opinion, and the experience of others, this objection is negligible. Of course strict aseptic technique must be carried out.

The following cases are illustrative of what can be done in the reduction of closed fractures and dislocations:

CASE 1.—L. S. S., male, aged 36, treated Feb. 27, 1928.

Sustained an injury from a fall off a building. There was a marked backward bowing of left wrist, patient having great pain. Roentgen-ray examination showed a comminuted fracture of the distal end of the radius. The distal fragments were displaced and angulated backward. Fifteen cubic centimeters of 2 per cent novocaine injected into hematoma and ten minutes allowed for anesthesia. It took about 20 minutes to get a good alignment of the fragments. Relaxation was satisfactory. A re-examination by X-ray after the application of the plaster cast showe the fragments to be in good position and alignment.

CASE 2.—J. K. M., a woman, aged 60, seen January 24, 1929. A very heavy woman received injury to right elbow by a fall from chair. Elbow swollen and very painful. X-ray of joint revealed the external margin of the condyle of the humerus to be detached and displaced downward. The head of the radius was fractured diagonally and was displaced on the external aspect at right angle to the shaft of the radius. Ten cubic centimeters of 2 per cent novocaine was injected into area of fracture; in about 12 minutes anesthesia and relaxation of the muscles satisfactory. Elbow manipulated many times in trying to get good reduction of head of radius. Patient free of pain. She refused open reduction. Arm put in flexed position and cast applied. X-ray showed fair position of head of radius, which was angulated anteriorly and fragments from external condyle of humerus to be displaced at about a forty-five degree angle. Results: there is no deformity, no pain, function good and patient satisfied 50 days after injury.

CASE 3.—G. E. S., a man, aged 34, treated July 31st, 1928, had been injured while cranking a car. Received a marked deformity to right wrist. He was in intense pain. Fifteen cc. 2% novocaine injected into joint. In 10 minutes good anesthesia and muscular relaxation. Reduction carried out. Splints applied. X-ray showed a transverse fracture in the shaft of the radius about 2 cm. above lower extremity. The lower fragment was displaced slightly posteriorly, but the alignment was good.

CASE 4.—E. J. S., a woman, aged 70, treated Feb. 21, 1928. Had fallen from porch, receiving an injury to left hip. Roentgen-ray examination showed a fracture of the left femur at the juncture of the neck, within the shaft. The lesser trochanter was detached and displaced upward and inward; the shaft was rotated outward. There was very little displacement. Patient was extremely nervous and in pain and movement of leg intensified the pain. Morphia sulphate gr. ¼ hypodermically. Fifteen cc. 2% novocaine injected into area of fracture by one puncture. In about fifteen minutes the patient was free from all pain. A Bucks' extension apparatus was then applied without discomfort to patient; 97 days later X-ray of left hip showed a well-formed callus sufficient for a good weight-bearing leg.

CASE 5.—Z. K., a man, aged 53, treated January 3, 1928. While running fell and injured right ankle. Ankle was swollen and quite painful. X-ray showed: a fracture of both internal and external malleoli. No displacement. Twenty cc. 2% novocaine used; ten cc. injected into each side of ankle. In seven minutes ankle could be manipulated without pain. Plaster cast applied. Re-examination by X-ray showed fragments to be in good position; the end results satisfactory to the patient.

CASE 6.—C. K. M., a man, aged 68, treated March 1, 1928. Had been injured by being run into by automobile, receiving a most severe deformity to lower end of right femur. Patient was in shock and suffering intense pain. X-ray examination of the right knee showed a comminuted T. fracture of the lower end of the femur. The condyles were separated and rotated forward and upward. Patient given morphia sulphate gr. ¼ in 2 cc. mag. sulph. 50%. 10 cc. of 2% novocaine was injected into the fracture from the outer surface and repeated from the inner surface, anesthesia and muscular relaxation taking place in fifteen minutes. Reduction was made without pain and plaster cast was applied. Re-X-ray the second day showed the reduction not so good. Local anesthesia was again repeated with success. Reduction carried out under fluoroscopic control and application of plaster cast. X-ray showed the position and alignment of the fragments to be greatly improved. The condyles were still separated and the internal condyle was displaced upward. X-ray of the same leg revealed an old ununited fracture at the junction of the neck of the shaft, where a false articulation had been formed.

CASE 7.—M. R. M., a female, aged 53, treated April 20, 1928, had sustained injury to right leg by an auto accident. There was a marked deformity of the middle third of the leg, and X-ray showed a comminuted fracture in the shaft of the tibia just above the junction of the middle and lower thirds. The fibula was broken at the same level and again 6 cms. lower. The fragments of the tibia were displaced backward and overlapped. Those of the fibula were angulated. The patient was an Italian woman, extremely nervous, and with ordinary mentality. She appeared to be suffering intensely from the injury. Morphia sulphate gr. ¼ in 2 cc. of mag. sulph. given hypodermically. The fractures were injected with 10 cc. of novocaine 2%, from each side of leg. In about 17 minutes anesthesia and relaxation of muscles were noted. The fractures were reduced without pain and plaster of paris bandages applied. Re-examination by X-ray showed satisfactory reduction.

CASE 8.—H. T., a man, aged 37, treated March 11, 1928, was thrown from an automobile, injuring right leg. He was having considerable pain. X-ray revealed a fracture of both bones just below the junction of the middle and lower thirds. The fragments were in good position and alignment. Morphia sulph. gr. ¼ with 2 cc. mag. sulph. 50% hypodermically, 15 cc. 2% novocaine was injected into the area of the fracture. In seven minutes the leg could be handled without pain; plaster of paris cast applied; re-X-ray showed good alignment of both bones.

CASE 9.—J. C. R., a man, aged 75, treated May 8, 1928, had received an injury to the left wrist in an auto collision; wrist greatly swollen and angulated posteriorly; patient experiencing intense pain in the arm. Roentgen-ray examination revealed a comminuted colles fracture. The end of the radius was split into several fragments which amounted to almost a crushing of the distal end; there was also a fracture of the styloid of the ulna. Morphia gr. ¼ given hypodermically and 15 cc. of 2% novocaine injected into the fracture area. In about 10 minutes we were able to reduce the fracture and put on a moulded cast without pain. Re-X-ray showed the position of the fragments, in the main, to be satisfactory. A recent report from patient gives the information that the results were satisfactory to him.

CASE 10.—F. J. E., a man, aged 40, treated September 9, 1928, had been injured from an auto accident, left elbow and upper part of forearm involved. X-ray showed an oblique fracture of the ulna about 10 cms. below the olecranon with displacement of the upper fragment toward the radius about 5 cms. There was also a fracture of the outer condyle of the humerus with only slight displacement. 10 cc. 2% novocaine was injected into the area of fracture. In about seven minutes elbow could be manipulated without pain. Arm was put up in a plaster of paris cast in the flexed position. Re-examination with X-ray showed lateral view to be satisfactory.

CASE 11.—F. D. A., a female, aged 54, treated March 28, 1928, on account of being injured severely in an automobile accident. She was in considerable shock and excruciating pain of the entire body. Morphia sulph. ½ gr. was given immediately hypodermically. The X-ray revealed the following: (1) A bad comminuted colles fracture of the left wrist; (2) Dislocation of left elbow; (3) A comminuted fracture of left clavicle; (4) An oblique fracture of the right clavicle; (5) The 4th, 5th and 6th ribs in the axillary line on the right side, and of the 7th and 8th near the vertebra fractured; (6) A fractured pelvis involving the horizontal and descending rami of the left pubis. 5 cc. 2% novocaine was injected into fracture of the left clavicle, 5 cc.

into left elbow joint and 10 cc. into left wrist. Allowance of 10 minutes for anesthesia to take effect, then the left clavicle, the left elbow and left wrist were reduced consecutively. The arm was incased in plaster. X-ray check-up did not show reduction of elbow complete. The following day cast was removed from the elbow, which was again injected with 10 cc. 2% novocaine and a satisfactory reduction made. The end results of all her multitude of fractures were very satisfactory. It may be of interest to add that she drove her car from Rochester, N. Y., to Miami last month and from there came by Tampa for me to see how happy she was over the satisfactory results obtained.

Conclusions

1. Practically all closed fractures and dislocations can be reduced with local administration of 2% novocaine.

2. The procedure can be executed without additional equipment and without a detailed knowledge of anatomy.

3. Positions may be examined, checked and rechecked, retention apparatus applied and adapted by the time muscle tonicity begins to return.

4. The method is devoid of shock, unpleasantness and hazards of general narcosis.

5. It is not necessary to hospitalize the ambulatory patients, and it may be readily carried out wherever the proper aseptic precautions may be obtained, operating room, dispensary or private office.

6. The danger of infection is negligible.

7. Novocaine anesthesia is contraindicated in the presence of infection, in a compound fracture, or where it has been used only a short time previously.

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DISCUSSION

Dr. J. Ralston Wells, Daytona Beach:

I would like to compliment Dr. McRae on his very interesting and comprehensive paper. I agree with Dr. Jobson that we do not use local anesthesia as much as we should. I have not personally had the desired relaxation with conduction, as I have by putting it into the fracture gap. But, possibly, that was because I did not use enough novocain.

I was very glad that Dr. McRae agreed about the point—with or without adrenalin. If used with adrenalin you do not get the quick absorption, and may get a longer anesthesia but not the absorption that you do without it.

With conduction anesthesia, it is very good in the arm as the brachial plexus is very easily found, and after 15, 20, or 30 minutes you get very good results. But, in the leg it is an entirely different matter. Even if you do know where the nerves are they are rather deep-seated. The muscles are as a rule very heavy, and after waiting a half hour you very often have to do it all over again, just waste a lot of time. In that instance I think injecting directly into the fracture gap is the proper procedure. The point of concerning reduction is very well placed because if you make a reduction not using the fluoroscope, and get a picture not entirely satisfactory, you still have plenty of time with regional anesthesia to re-reduce it into better position, that you would not have under a general anesthetic.

The synergistic action between magnesium sulphate and morphine is very good. Your local works that much better if your nervous patient can be calmed down before using the novocain. I have used this many times, using 2 cc. of a 50% magnesium sulphate with morphine sulphate gr. ⅛, given intramuscularly. May repeat 3 doses at ½ hour intervals. Dr. McRae stated he had reduced a fracture at night when he could not get the roentgenologist and had gone ahead anyhow. It is good surgery to treat all fractures as emergencies, because if a fracture is reduced early you don't have the results of the trauma, other than the fracture; your anesthetic works better and your parts have not become edematous. Whether you have the roentgenologist or not you have novocain, and the reduction you get, either without the roentgenogram to follow up or with-

out the fluoroscopic study, is by far to be preferred over waiting for 6, 10, or 12 hours to have your roentgenogram made, after which a more difficult procedure and not as good result is obtained.

A criticism on local anesthesia in fractures is like one I had last night in Daytona. The patient was a great, big, heavy muscled, strong man. We injected the brachial plexus and waited long enough, but did not get relaxation of the muscles, and we had to use gas and put that gas over ether before we could get a relaxation. It is true that in possibly 25% or 30% of the cases you do not get the relaxation that you might have with a general anesthetic, but the more experience we have in local conditions, the more proficient we will become. I do not think that you get the muscle relaxation that you do under general. Under general you have to wait sometimes 15 or 20 minutes, before that patient comes out, to hold the fragments in place. With local anesthesia, all of the muscles are needed to hold the bone where you put it, and an extreme degree of relaxation therefore is not always to be desired. Suit your choice of anesthetics to the patient and not the patient to the anesthetic.

Dr. E. H. McRae, Tampa (closing):

Regarding muscle relaxation: So far, I have had very little trouble in getting relaxation, provided I wait approximately fifteen or twenty minutes. If you use 2% novocain and inject enough into the hematoma and then wait you will certainly get relaxation. In all of these cases, particularly the case that showed a fracture of the lower end of the femur where the condyles were separated and the patient was a very large muscular man—we had perfect relaxation. You do not have to handle your cases roughly, particularly your colles fractures. You get a relaxation and reduction in a nice gentle way provided you use 2% novocain and place it in the hematoma.

Dr. Jobson spoke of the cranial fractures: Most cranial fractures can be done under local anesthesia. In fact, nearly all of them can. In this method all you have to know is the gross anatomy, and know approximately where the fracture is, then introduce a 2½" needle into the fracture gap, inject the novocain there, have a little patience, and I guarantee that in 95% of the cases you will have a good relaxation of the muscles and a satisfactory anesthesia.

VENOMOUS SNAKES OF NORTH AMERICA AND TREATMENT OF THEIR BITES*

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As a result of unusual interest in the treatment of snake bite following the recent death of a child in our community from the bite of a moccasin, the program committee of our Society was asked to have some member present a paper on the subject.

The writer, having long been interested in the subject, has volunteered to present the following, and wishes at this time to acknowledge his indebtedness for information and material to:

1. Dr. Afranio do Amaral of Brazil.
2. Dr. M. L. Crimmins of the San Antonio Antivenin Station.
3. Dr. Robert A. Strong in the International Medical Digest.
4. Dr. H. R. Eichelbaum of Panama.
5. And extracts from articles appearing in the Bulletin of the Antivenin Institute of America.

Usually if anyone mentions snakes in any gathering everyone present is very anxious to contribute information, regardless of its accuracy.

Someone is bound to speak of the hoop snake that takes its tail in its mouth and chases its victim down the hill and finally sticks its "venomous" horn into the tree behind which the terrified victim seeks refuge. The victim is saved but the tree instantly dies and falls to the ground.

In view of the fact that the dissemination of information concerning snakes has, for the most part, been by the oral exchange of persons whose normal poise has been so upset that their observations become distorted, it is not at all surprising that so much misinformation concerning snakes exists.

Herpetology has evidently been the most neglected branch of zoology. Snakes have been classified, their habits and methods of propagation studied, but after all, the sum total of the knowledge did not include a single reliable treatment for "snake bite". In answer to dissenting members let it be said that those who recovered did so in spite of the treatment.

Things have changed, however, and the serpent is being slowly but surely deprived of its terrors

*Read before the Hillsboro County Medical Society, July 2, 1929.

to man. The advance of civilization—the clearing of fields, the drainage of lowlands, the use of snake skins in the manufacture of handbags, shoes, and other wearing apparel—all have had a great part in removing this terror.

Most important, however, has been the coming of that scientific master of the serpent, Doctor Afranio do Amaral of Butantan, Sao Paulo, Brazil, to direct the creation of the Antivenin Institute of America.

Some idea may be formed of the important part Dr. do Amaral has played in the study by reviewing the progress which has been made.

The actual start of this work took place in the Pasteur Institute about 25 years ago, when Doctor Calmette immunized horses against the action of cobra venom and obtained a serum that was used to meet the serious problem which has long been known to exist in India.

About 15 years ago the eyes of the world were turned towards an institute which had been established in Butantan, Brazil, for the production of a serum for the venom of the snakes of Brazil. This department was under the Directorship of Doctor Vital, Brazil, whose studies were continued by Florenzo Gomez, who was finally succeeded by Doctor do Amaral.

The effectiveness of these sera have been shown from the fact that, when the campaign was begun, statistics of the State of Sao Paulo showed an average of 150 deaths a year from a total of 1,500 snake bites. At present the death rate has been reduced to only from 3 to 5 cases per year and these deaths can be frequently attributed to improper treatment previous to the utilization of serum.

This achievement represents 25 years of consistent effort marked by many mile-stones of discouragement. Great opposition resulted from ignorance and superstition and from perversity in many individuals otherwise mentally capable. To overcome this opposition it was necessary to educate the people by lectures, and by the distribution of pictures, and pamphlets. An arrangement was entered into between the Institute and the people living in snake-infested regions, by which supplies of serum were exchanged for living healthy specimens of venomous snakes. In this manner the Institute soon succeeded in obtaining an increasing number of snakes until it reached more than 10,000 a year, and the problem of snake bite in Brazil soon became a negligible factor.

Antivenin Institute of America. There were several in the United States who had been watching the progress made in handling this problem in Brazil, and they became intensely interested.

Incomplete statistics which have been obtained show that there are over 1,000 cases of bites of poisonous snakes in this country every year, with a death rate that averages about 22%. It was therefore realized that the time had come when steps would have to be taken to produce a serum that would be specific for the three chief venomous snakes in the United States.

One of the first steps taken towards the production of an adequate supply of antivenin serum was to invite Doctor do Amaral to take charge of the work.

It was found that the production of a polyvalent serum which would be specific for the rattlesnake, the copperhead and the moccasin would be all that would be necessary, since the only other snake in the United States capable of causing death is the coral snake. The number of fatalities occurring from this snake, however, are so few that it has been considered impracticable to produce a specific serum for this type.

Collection of Venom. In order to obtain an adequate supply of venom, stations were established throughout the United States for collecting live healthy specimens of the three varieties for which a specific polyvalent serum is being made.

The first step necessary is the preparation of the container into which the venom is going to be "milked". A sedimentation glass of about 50 c.c. capacity is covered with a sheet of rubber through which a circular opening about one inch in diameter is cut near the edge. The object of the rubber cover is to pad the edge of the glass to prevent injury to the snake's mouth.

The sedimentation glass is then fixed in a wooden block which is screwed to a table. Then the snake's head is thrust toward the cover of the glass. When the snake implants its fangs into the rubber covering pressure is applied to prevent withdrawal of the fangs and to milk out the venom. After the venom is collected it is dried and the crystals are used after dilution and preparation as an antivenin for the immunization of horses for the production of serum.

Snake venom is a thick amber-colored liquid, neutral or slightly acid, specific gravity 1030 to 1050; soluble in normal saline; when dried it forms clear yellowish-amber crystals. It is com-

posed of a powerful fibrinferment; an antifibrinferment, which attacks the coagulating element of the blood; a proteolytic ferment which dissolves muscular tissue; cytolysins which dissolve the red and white blood cells, endothelial and nerve cells; antebactericidal substances of the nature of an anti-complement; neurotoxins with an affinity for the nerve terminals of the muscles; a neurotoxin, with a special affinity for nerve cells and a substance which attacks the cardiac muscle and causes the heart to stop in systole in some cases.

It will be noticed then that this venom is hematoxic and neurotoxic, which is contrary to the former teaching that it was exclusively hematoxic.

The amount of venom secreted at one time by a snake varies greatly according to size and age of the specimen, conditions under which it is kept, length of period of fasting and repose, etc.

A snake never ejects the entire content of the glands when it bites. It always holds back part of its venom, apparently for the next bite. The amount excreted at first represents but 25 to 75 per cent of the total.

How the Snake Strikes. Before outlining the modern serum treatment of snake bite, it may be well to discuss some of the methods of defense used by snakes. (The word "defense" is used because with a very few exceptions snakes will not attack a human). The venom of a snake is given to him primarily to destroy the animals which he uses for food, but, of course, he uses it also for defense.

The poison glands are situated on each side of the head below and behind the eyes, near the angle of the superior and inferior maxilla. They are surrounded with a capsule of fibrous tissue which is a prolongation of the zygomatic ligament and fibers from the temporal muscles. The excretory canal follows an upward, forward, and downward course to connect with the lumen of the fang which is not unlike a hypodermic needle. The main pair of fangs are attached to the anterior part of the maxilla and fold back against the roof of the mouth. When the snake bites, they are raised by the pterygoid bone and muscle to an angle of 90°.

It is absolutely necessary that before a rattler can strike he must coil up for a spring.

In effecting the forward thrust of the head and neck, the serpent employs only the upper part of its body and consequently is unable, under any circumstances, to strike at a greater distance than one-half its length and in order to strike effectively, at least half of the snake's body must remain on the ground, and any belief that a snake is capable of completely springing off the ground is absurd. So, if the precaution of wearing leather puttees is taken, the chances of being injured by a snake striking the lower limbs are remote for the reason that the fangs will not be very likely to penetrate the leather.

Venomous Snakes of the United States. As a general rule, most of the poisonous snakes belong to the pit-viper family which includes the rattlesnake proper, the ground rattler, the copperhead, and the moccasin.

As before mentioned, the only other poisonous snake is the coral snake, which is about two and one-half feet long and is black from the end of the nose to the back of the eyes. There is a band of yellow followed by a black band and a narrow yellow band followed by a broad red band. From this point on, there are about 14 or 15 broad black and broad red bands separated by a narrow yellow band. All of these bands are around the body, and there are two black and two yellow bands around the tail.

Practically every portion of the United States, with the exception of the extreme northeastern part, is inhabited by poisonous serpents.

Doctor Raymond L. Ditmars reports that in the past two years he has received more than three dozen large copperheads, captured within city limits of New York.

The writer personally knows of nine rattlesnakes killed in the city limits of Tampa within the past 18 months. Two of them were killed on Franklin Street.

Factors Tending to Reduce the Severity of Snake Bites.

1. The snake missing his goal. The snake does not see well during the day or before shedding, and may miscalculate the distance and strike a glancing blow without injecting venom.

2. Diminution in amount of venom, due to (a) hibernation, (b) aestivation, (c) previous exhaustion of the venom in feeding, (d) captivity.

3. Bite being inflicted through clothing that retains some of the poison.

4. Movement at the time of strike making imperfect bite.

5. Region bitten being very lean, having little connective tissue, as on the finger, toe or shin.

6. Region bitten being very fat, so that its circulation is poor.

7. Ejection of part of the venom before the snake strikes.

8. Age of the snake—very young or very old specimens produce little venom.

Physiological Action of the Venom on Human Tissues.

The hemolytic action causes a destruction of the red and white blood cells and the proteolytic action the destruction of other tissues. The antibactericidal action favors the development of gangrene as a consequence of the bite.

Symptoms of Snake Bite.

a. *Profuse bleeding* at bite due to the antecoagulative action of the venom.

b. *A fiery pain* due to the action of the venom on the nerves.

c. *Rapid swelling* due to infiltration of connective tissue by the passage of blood caused by a venom haemorrhagin of the nature of a cytolysin, which causes destruction of the endothelial lining of the smaller blood-vessels near the site of the bite.

d. Neurotoxic symptoms, *nausea and vomiting.*

e. *Rapid pulse,* sometimes double the normal and followed by very low blood pressure.

f. *Discoloration.*

Autopsy findings in fatal case of snake bite.

Rigor of death noted.

Fang punctures were found on the leg. The skin and subcutaneous tissue in the region of the fang marks were necrotic, and the entire leg was edematous and discolored. Local hemorrhages were present in the skin. The blood in the large vessels, four hours after death, was in a fluid state.

Heart—Contracted ventricles. Epicardium and endocardium were dotted with ecchymoses. The muscle was anemic and had a "boiled color" appearance.

Lungs—The pleura covering the lower parts showed petechiae, and there were a few small hemorrhagic infarcts. The bronchial trees were filled with blood-stained fluid, and a similar fluid escaped from the cut surface of the parenchyma.

Spleen—Slight enlargement noted. The Malpighian bodies were visible.

Kidneys—The peri-renal tissues showed a bloody extravasation. The parenchyma presented a waxy appearance, and the glomeruli and tubules were visible macroscopically. The adrenals were negative.

Liver—The cut surfaces presented a yellowish color, and there seemed to be a definite fatty change present.

Stomach—was dilated and filled with bile-stained fluid. Hemorrhages were visible in the mucosa.

Pancreas—Negative.

Intestines—Hemorrhages were visible in the mucosa.

Bladder—A small amount of bloody urine was present.

Microscopic Pathology corresponded with gross pathology.

Treatment of Snake Bite.

Fortunately in so many ways, snake bites are usually inflicted upon some part of the extremities. If antivenin serum is not immedately available, a tourniquet should be applied above the bite, tightly at first, but must be partially released for a few seconds at intervals of 5 or 10 minutes, so as to maintain the necessary circulation. There is no particular advantage in the making of a free incision, although there are several investigators who insist that incisions are beneficial and both sides of the question will be considered.

Doctor do Amaral very definitely contends that the free bleeding at the site of puncture does not drain off any of the venom which the snake injects. He cites experiments which he has made on mice to support this contention. Injections of minimum lethal doses into the tip of a mouse's tail were effective in causing the death of the mouse, notwithstanding the fact that the tail was immediately cut off some distance above the injection.

Opposed to this, Jackson contends that crucial incisions a quarter of an inch long over the fang mark and a double line of small cross-cuts about one-eighth of an inch deep encircling the limb proximal to the edge of the swelling are decidedly beneficial in conjunction with the serum treatment. He further insists that a very considerable amount of venom can be extracted through these cuts if adequate suction is made. In support of his contention he reports a vast number of experiments on dogs and a number of clinical experiments in humans accidentally bitten by snakes.

It is difficult to decide after a consideration of evidence presented, but Doctor do Amaral raises

another very important point, that it is a well recognized fact that venomous snakes are capable of harboring the spores of tetanus and the B. WELCHII in their mouths, and the possibility of inviting infection from these organisms by additional trauma cannot be disregarded. In view of the fact that the average venomous snake is capable of injecting from 10 to 15 lethal doses, it would seem that the amount of venom recovered through an incision with a suction apparatus would hardly be sufficient to justify the risk of a tetanus or gas bacillus infection.

The desirability of making some local application has always been included in most treatments for snake bite, and the most frequently suggested application has been that of potassium permanganate. No evidence has been adduced up to the present time to prove that potassium permanganate has any effect at all in neutralizing the venom although evidence has accumulated to show that it causes the local destruction of tissue. Doctor do Amaral has found in his experience that it is entirely useless, and its local effect may be as harmful as incisions are insofar as creating ideal sites for the propagation of tetanus and gas bacillus.

Stimulants are contraindicated for the reason that they accelerate the distribution of the venom.

Serum Treatment.

Fortunately North American snake venoms are usually slow in acting and, if the antivenin serum can be obtained within 12 or 24 hours after the bite, the chances of its being effective are very good. If the antivenin serum is available at the time of the bite, the application of a tourniquet is not necessary. It is supplied in 10 c.c. syringes and is ready for instant use. As a general rule, the content of one package is sufficient, but in the case of a young child it may be necessary to inject two doses. Likewise, if there is reason to believe that the poison injected by the serpent is unusually large, or when the symptoms develop quickly and in severe form, it is frequently advisable to give a second, third or even fourth dose both intramuscularly and intravenously at intervals of 2 to 5 hours if the condition does not improve promptly.

The results with antivenin serum indicate that it is the most reliable treatment available at the present time, and there is every indication that recovery should be one hundred per cent if the serum is given sufficiently early and in adequate amounts.

Report of Cases.

Case 1:

Girl, age 7, taken to the hospital seven hours after being bitten, three inches above the ankle by a rattlesnake. The leg was swollen to twice normal size, and was dark purple. The patient was in great pain. No other symptoms noted. General condition good. No antivenin serum was available for several days. Incisions were made over the punctures, and the leg immersed in hot potassium permanganate solution 1:3000. This was continued for twenty-four hours, and the leg was then kept in warm permanganate dressing for several days, but did not stop the swelling and discoloration, which advanced across the abdomen to the sternum. Patient gradually recovered and was taken home twenty-one days after admittance, still somewhat weak, and with mottled purple discoloration over the area involved still present. This patient must not have received a very large dose of venom as she suffered no general toxic effects—and yet, without antivenin her recovery required several weeks.

Case 2:

A twenty-seven-year-old man admitted to hospital with two fang marks in right index finger, and severe purple swelling extending to line just below right elbow, where a tourniquet had been bound. He had great pain in the affected arm and staggered with dizziness. Bitten ten hours before entering the hospital. A 10 c.c. dose of antivenin serum was injected intramuscularly, the tourniquet removed, and his hand placed in 1:3000 potassium permanganate. The following morning he felt so well he was allowed to go home. All pain and practically all swelling had disappeared. This patient, although suffering from general toxic symptoms on admission, was so greatly improved following administration of antivenin that he was discharged from hospital in less than 24 hours.

Case 3:

A fourteen-year-old school girl, bitten on left forearm by a rattlesnake. Twenty-six hours later when she was brought to the hospital she appeared almost dead. No pulse obtainable. Skin cold and clammy. Extremely restless and in great agony. At intervals delirious. Entire left arm and the left side of chest purple and severely swollen. No paralysis noted. Antivenin serum was not obtainable at the time. Compresses of potassium permanganate applied to arm and chest, and she was given a quarter grain

of morphine. Four hours after reaching hospital she was dead. No autopsy. It is hardly likely that antivenin could have served this patient, as she was practically dead when admitted to the hospital.

Case 4:

A nine-year-old boy, bitten by a rattlesnake in calf of right leg. Eighteen hours after accident he arrived at hospital. A ligature was barely tight enough to shut off flow of blood and lymph in superficial vessels, and certainly had no constrictive effect on deep arteries and veins. Ten c.c. antivenin serum given intramuscularly and tourniquet removed. A few hours later moderate swelling and discoloration had extended to right thigh. Discharged 3 days later in good health, the swelling and discoloration having disappeared in that short time.

Conclusions:

1. That the application of a tourniquet immediately following the bite may be of value when antivenin is not immediately available.

2. That the administration of circulatory stimulants in the early treatment of snake bite is contraindicated.

3. That the efficacy of incisions, punctures, suction, etc., at the site of the bite is not of proven value, but the contraindications are not of great importance.

4. That the local application of potassium permanganate and other chemicals is of very doubtful value, but not contraindicated.

5. That antivenin is a specific, proven beyond doubt, and should be given early and repeated as often as indicated during treatment.

6. That those who have recovered from snake bite without antivenin probably did not receive a lethal dose of the venom.

7. That both the medical profession and laity should be given more instruction concerning the subject of prevention and treatment of snake bite.

FRACTURES OF THE PELVIS*

Their Treatment by Murphy Sling.

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With the increasing use of automobiles and a subsequent increase in accidents more or less severe, fractures of the pelvis have become a fairly common form of injury. The very nature and location of the pelvis makes it necessary that force or great violence be involved in the production of its fracture. A fall from a height, a crushing injury between two moving objects as in a railroad collision or an automobile wreck, a fall of heavy timber, a mass of rock, all, are liable to produce a fractured pelvis.

These fractures are frequently multiple, and, except when produced by a gunshot injury or an automobile accident, are scarcely ever compound. They are of special importance as regards danger of life, from the possibility of damage to the pelvic contents, which may be injured either by the violence itself, the forcible displacement of the bones, or by perforation from a sharp-pointed fragment.

The fracture may involve the entire pelvis or any one of the several bones composing it. There are many types of injury produced but they may be grouped under three general headings: (1) injuries of the pelvic ring; (2) isolated fracture of the pelvic bones not affecting the continuity of the pelvic ring; (3) isolated fractures of the acetabulum or coccyx.

By far the most serious type of injury that can affect the pelvis is the one which causes an interruption in the continuity in the pelvic ring. The pelvis has three functions: first, to bear and transmit the body weight; second, to support and protect the pelvic and abdominal viscera; and third, to provide a means of attachment for muscles. Fractures involving the pelvic ring are apt to affect all three functions.

Clinically, pelvic fractures can be classified into two general divisions: those with intrapelvic injury and those without intrapelvic injuries. Fractures with injuries to the intrapelvic viscera depend on the manner of the accident and the place of its receipt. The very nature of the violence producing the fracture frequently determines the severity of the injury and the probability of complications. Direct violence from heavy blows or crushes is the most frequent cause of injury, while indirect violence transmitted from the hip or thigh is a much less common cause. Damage to the bladder, urethra and blood-vessels with less commonly, damage to the intestines in these, cases becomes the feature of most importance rather than the fracture itself.

The point at which the violence or force is applied determines the site of fracture. Force inflicted from side to side is likely to involve the crest of the ilium and pubic ramus on the same or opposite sides; from before backward, the

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horizontal and descending pubic rami suffer mainly. In younger patients, the fracturing may occur through one or all of the three developmental lines. When this occurs as a fracture of the acetabulum, the X-ray appearance is similar to that of an epiphyseal separation in the long bones. The pubis is the most frequently broken bone, next the ilium, and the ischium, rarely. Fractures of the coccyx occur usually as isolated individual fractures. Displacement is ordinarily not marked.

Symptoms.—Disability generally is instant and complete, due to the pain, deformity and shock. The pain is due, as in all injuries, to damage to the nerves involved at the site of injury.

Deformity may show by swelling and ecchymosis over the seat of injury, and the anterior spine or iliac crest may show malalignment. Crepitus, motility and local pain can often be elicited; pain transmitted by lateral pressure over the buttocks or through the thigh is very suggestive. Rectal or vaginal examination will often give confirmation, as thereby the fragments or irregularity may be felt. X-ray examination is often the means of determinative value. An ecchymosis along the perineum that diffuses into the upper and inner thigh, and over the scrotum is a pathognomonic sign. Ecchymosis that appears late and which is located any place distant from the site of impact is always suggestive of fracture of any part of the skeleton.

Urethral involvement may be indicated by bloody urine, dysuria, retention or extravasation into the perineum, where it appears as a boggy swelling. The membranous portion of the urethra is most often affected and it may be torn completely across, punctured or simply pressed upon by bone or effused blood. Later the scrotum or labiæ may be much swollen.

Bladder involvement is generally intraperitoneal and can be determined by the passage of bloody urine or retention. Careful cystoscopic examination is valuable, but should be attempted only by an experienced cystoscopist. Formerly the usual test for ruptured bladder was to inject a known quantity of sterile salt solution, and then withdrawing and measuring it. If less fluid was withdrawn than had been injected, an intraperitoneal rupture of the bladder was diagnosed. This procedure has been recognized as dangerous and is less and less employed by surgeons who handle a large number of these injuries. The extent of bladder rupture varies from a small hole to an extensive laceration. Urinary tract involvement is most often seen as a complication in fractures of the pubis.

Blood vessels such as the iliac, pubic, obturator and gluteal vessels may be torn or bruised, leading to hemorrhage or thrombosis and embolism.

Treatment.—In considering the methods of treatment, I shall speak somewhat generally with reference to treatment of complications, and more specifically with reference to a single measure that has proved very successful in the treatment of fractures of the pelvis. Shock is given the usual attention, such as morphine, atropine, external heat and hypodermoclysis.

Urinary tract damage treatment depends on its extent. If extravasation into the perineal region occurs and a catheter cannot be passed, after a few cautious trials, an external urethrotomy is performed and the torn urethra stitched at once; or, better, a drainage-tube is inserted in the bladder and repair made later if the opening does not spontaneously close. It is extremely difficult to identify a torn urethra after such an injury because the tearing of the soft parts and the clotted and fresh blood effectually obscure the field.

Bladder damage requires opening of the abdomen and layer suture of the rupture if it is not too large, otherwise it is sewed about a drainage-tube having its exit suprapubically. In any event, drainage of the skin incision and soft tissues, which might become infiltrated with urine, must be provided to prevent a subsequent breaking down of the wound with chronic fistulous formation.

Blood vessel injury requires attention only if intra-abdominal hemorrhage seems apparent.

Intestinal involvement is shown by early rigidity of the abdomen, tympanites and pain; vomiting and other signs of peritonitis may follow. Early laparotomy is indicated for suture or anastomosis of the injured bowel.

Bony damage calls for two things; reduction and immobilization. Reduction is accomplished as easily as possible. A broken crest or ramus sometimes allows replacement by pressure or manipulation and subsequent retention by pads and adhesive. Ordinarily, all that can, or, need be done for simple fracture without intrapelvic damage is to apply wide bands of adhesive about the pelvis. Extention of both lower limbs and abduction of the hips will usually produce satisfactory reduction. The foot of the bed fre-

quently should be elevated so as to adjust the weight of the two limbs and relieve the pelvis of their burden. Where there is, in addition to the fractured pelvis, fracture of the thigh or leg, the use of one or more double incline basket splints, such as the Hodgen's splint, will prove very satisfactory.

Immobilization of pelvic fractures is accomplished by utilizing the pressure and pull of muscles attached to the pelvis on the one hand and application of external pressure on the other. A most excellent method for handling any type of pelvic fracture is that worked out by Dr. Douglas P. Murphy, while he was in charge of the fracture service in Evacuation Hospital No. 1, A. E. F., during the World War. The happy results that have been obtained from the use of this method, the Murphy sling, impelled me to bring the method to your attention and outline it in detail. A Balkan frame is attached to the patient's bed, but may be improvised by using a 2x4 six feet long, lashed upright to the head of the bed and one lashed to the foot of the bed, supporting across their top a timber of sufficient size to support the patient's weight. Take a piece of strong canvas wide enough to extend from the ischial tuberosities to the twelfth ribs and long enough to loosely encircle the patient's body; make a seam at either end and place six eyelets in each seam; make a crossbar of wood two inches longer than the canvas is wide and, on two of its sides, screw six right-angle screw-hooks into which the eyelets can be hooked. Drill a hole across each end of the crossbar for attachment of pulley ropes. Pass the ropes through pulleys attached to the piece of timber suspended on the uprights and attach just sufficient weight so that the hips are supported but not raised from the bed. When placing a bed pan or sponging the patient, enough weights to support the pelvis above the bed can readily be attached. The sling should be worn for five weeks, then removed and the patient remain in bed either on a Bradford frame or with a pelvic binder for another two weeks. The advantages of this type of treatment are, constant pressure of the muscles, regulation of the pressure, reduction of pain, patient's bodily wants easily cared for, shortening of convalescence, and simplicity of apparatus.

Perhaps the advantages of the Murphy sling treatment may best be emphasized by two case histories, one without complications and the other complicated.

CASE 1.—White man, age 36, sawmill laborer, injured by being struck on the left hip by a heavy timber, that was thrown backward from a gang-saw. The attending physicians made a tentative diagnosis of a fractured hip, but X-ray examination made immediately upon his arrival at the hospital disclosed the presence of multiple fracture of the pelvis, involving both rami of the left pubis and the body of the left ilium. The injury had occurred ten or twelve hours before the patient was admitted to the hospital and adequate treatment of primary shock had been instituted. There was no evidence of any complicating injury. This patient was suspended in a Murphy sling for a period of five weeks, after which he remained in bed for another week, when he was allowed up in a chair. However, he insisted on walking on crutches and at the end of the seventh week returned home and immediately discarded his crutches. Three months after his injury he returned to his former occupation at which he has been continuously employed.

CASE 2.—White man, age 24, bookkeeper, thrown from automobile in highway accident, when the car in which he was riding collided with a concrete bridge railing. Seen one hour after accident, shortly after his admission to the hospital. Patient exhibited marked degree of shock and complained bitterly of severe pain whenever his right leg was moved or when pressure was made about his hips. Immediate X-ray examination disclosed a fracture of the right pubis, near the symphysis, together with a fracture-dislocation of right ilium. A small amount of bloody urine was obtained by catheter. A diagnosis of ruptured bladder was made and immediate operation confirmed this diagnosis. The rent in the bladder was closed by layer sutures and a suprapubic drain together with a soft tissue drain was inserted. Patient was suspended in a Murphy sling for a period of four weeks, at the end of which time the suprapubic opening had closed and urine was being passed normally. An adhesive plaster swathe was applied to the pelvis and he was allowed to be transferred to a hospital in Birmingham, Alabama, where he remained for two weeks longer with no additional dressing of the pelvis. At the end of that period he was able to leave his bed in a rolling chair, and was walking with crutches at the end of seventh week from date of injury. Patient has since returned to his former occupation with no

ontoward symptoms with reference to his fractured pelvis.

Fractures of the acetabulum or coccyx and other isolated fractures are diagnosed by X-ray. Treatment in each case will depend on the amount of damage and the location of the fracture. Painful fractures of the coccyx may require excision of the broken bone as a matter of relief from pain. Recovery in each case of isolated pelvic fracture is the general rule and it is surprising how little loss of function will obtain in pelvic fractures, no matter how treated, but each will have a more comfortable period of disability if given the advantages of the suspension treatment as exemplified by the Murphy sling.

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TULAREMIA*

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Tularemia is an infectious disease caused by the bacterium tularense. Primarily a disease of wild rodents, secondarily it is a disease of man.

Cases of this disease have been reported from almost every state in the union, the exceptions being the New England States, Wisconsin and Washington. Up to July 31, 1928, 650 cases were reported by the U. S. P. H. S.; of these 6 were reported from Florida.

The disease was first reported in 1911 by McCoy as appearing in the California ground squirrel; later it appeared in wild rabbits. Domestic rabbits raised in rabbiteries and sold for food or laboratory purposes have never been found naturally infected, although highly susceptible by inoculation in the laboratory. Recently the disease has appeared in sheep.

The transmission to man occurs:

(1) by the bite of the horse fly.

(2) by the bite of the wood tick.

(3) by the bite of the commonly known cattle tick of the south.

(4) by the contamination of his hands or his conjunctival sac with portions of the internal organs or with the body fluids of infected rabbits, flies or ticks, and,

(5) by the bites of animals.

The transmission of the disease among rodents is probably by blood-sucking insects, although in the laboratory it has been shown that the infection will pass through the skin on the abdomen of a rabbit without an abrasion, but a pustule will form at the portal of entry. In man the same is true and many cases do not give a history of an abrasion.

Four clinical types of the disease are described:

(1) Ulcero-glandular, the primary lesion being a pustule. Later an ulcer of the skin and accompanied by enlargement of the regional lymph glands.

(2) Oculo-glandular, the primary lesion being a conjunctivitis and accompanied by enlargement of the regional lymph glands.

(3) Glandular, without primary lesion but with enlargement of the regional lymph glands.

(4) Typhoid, without primary lesion and without glandular enlargement.

The period of incubation varies from 24 hours to 10 days, the average being three and one-half days.

The onset is sudden and characterized by headache, vomiting, chilliness, chills, aching body pains, sweating, prostration and fever.

In the ulcero-glandular type the patients usually, within 24 hours after the onset, complain of pain in the area of the lymph glands which drain the area and the glands are found to be enlarged and tender, only the regional glands being involved and not those of other parts of the body. Twenty-four hours later a painful, swollen, inflamed pustule appears at the site of the infection. This papule breaks down, liberating a necrotic plug and leaving an ulcer about three-eighths inch in diameter and having a characteristic punched out, crater-like appearance. In about one-half the cases the lymph glands suppurate and abcess, rupturing through the skin, the remaining one-half glands do not break down but remain hard, palpable and tender for two or

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three months. Subcutaneous nodules are frequently noted on the forearm and appear as isolated. Nodules or the entire chain can be palpated; these vary in size from the size of a pea to 1 cm. in diameter.

Weakness, loss of weight, recurring chills, sweats and prostration are noted during the active stage of the disease which lasts from two to three weeks.

In the oculo-glandular type, the cases follow the general description of the ulcero-glandular type, except the primary localization is in the conjunctival sac, usually unilateral and characterized in the early stages by conjunctival irritation, weeping, swelling of the lids and surrounding tissues, edema of the ocular conjunctiva and usually a papule on the conjunctiva of the lower lid. The pre-auricular, parotid, submaxillary or anterior cervical lymph glands are swollen, painful and tender and in severe cases the axillary group may be enlarged. Small ulcers soon appear on the conjunctiva of both lids. The constitutional symptoms are the same as for the ulcero-glandular type, but in severe cases convulsions, delirium and stupor may appear.

The typhoid type is characterized by fever and is only diagnosed by a negative Widal and a positive agglutination of bacterium tularense.

The duration of the disease is from two to three weeks; the fever gradually declines to normal after the sudden onset with a remission after the first, second or third day, this being followed immediately by a secondary rise to the original height. During the remission of the temperature all symptoms of discomfort disappear but all return with the secondary rise of the temperature. A bilateral macular, papular, pustular or blotchy rash may be present. The convalescence is slow, usually two or three months pass before the patient is able to work due to the profound weakness on exertion.

Of the 679 reported cases 24 died; of these 6 were due to broncho-pneumonia, 2 to lobar pneumonia, 6 with maningeal involvement, 2 general peritonitis, 2 coma and renal involvement and 1 to enteritis.

The disease is usually erroneously diagnosed as "flu", septic infection, typhoid fever, pneumonia, malaria, tuberculosis, due to the glandular involvement or sporotrichitosis on account of the subcutaneous nodules.

The diagnosis will seldom fail if four points are borne in mind; viz.:

(1) a history of having dressed or dissected a wild rabbit or of being tick-bitten or fly-bitten.

(2) a primary lesion of the skin in the form of a papule, followed by a persistent ulcer or a primary conjunctivitis, followed by a persistent ulcer.

(3) persistent glandular enlargement in the region draining the primary lesion, and

(4) fever of from two to three weeks' duration. The diagnosis can then be proved by (1) an agglutination of bacterium tularense by blood serum collected in the second week of the illness or (2) by isolation of bacterium tularense from guinea pigs inoculated with material from the primary lesion or from enlarged glands or from the blood of the patient.

The bacterium is destroyed by heat of 57 degrees F. for ten minutes; therefore, thorough cooking renders infected rabbits harmless when used for food.

The treatment is symptomatic, rest in bed; the glands should not be incised.

W. E. M., age 45, male, white, single, admitted to the Alachua County Hospital Sept. 19, 1928, occupation farmer, native of Florida. Chief complaint, chills and fever, with a constant, severe frontal headache. The onset was 8 days prior to admission and was manifested by a chill which lasted from ten to fifteen minutes and followed by a temperature of 104 degrees F., which continued high from the onset, except for a remission on the second day, with frequent rigors, vomiting, bodily pain, profuse sweating and a constant headache.

On admission the temperature was 103^2, pulse 108, respiration 24. On physical examination the patient was very weak, the skin moist, a very large, firm, tender axillary gland in the right axilla and the right epitrochlear was markedly enlarged and tender. On the middle finger of the right hand a pustule 1 cm. in diameter was found which the patient stated was due to an infection following an abrasion by a splinter of wood. The patient stated that the abrasion was sustained three days before the onset of the present illness and on the same day he killed a wild rabbit and dressed it before feeding it to his kittens. With the onset of the illness the finger became swollen and on the third day of the illness the axillary glands began to swell and become tender. Forty-eight hours after admission the necrotic plug was

liberated from the pustule, leaving a punched-out ulcer and at this time 15-20 small subcutaneous nodules appeared on the extensor surface of the forearm. On the 17th day of the disease the temperature reached normal and the subcutaneous nodules on the forearm were beginning to disappear, the epitrochlear and axillary glands were reduced in size.

The State Laboratory does not furnish cultures of bacterium tularense for agglutination; therefore it was necessary to inoculate a guinea pig with the patient's blood to prove the diagnosis.

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MEDICAL ETHICS*

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During the past months many very interesting papers on the different phases of medicine and surgery have been presented to us at the regular meetings of this society. I would ask your indulgence at this time, to consider briefly with me a different aspect of medicine, namely, medical ethics and ideals.

It is not my intention to try to teach the members of Pinellas County Medical Society, medical ethics, for I am sure that many of you know more about the theory and teachings of ethics than I do, but I want to call your attention to the littleness of non-ethics and the beauties of ethics. The ethical man advances the cause of medicine, while the non-ethical man hinders the cause of medicine by his hypocrisy and his poorly directed efforts.

He has no ambition to dignifiy the profession, or build up the morals of his community, but only seeks to satisfy his personal greed.

To the younger men I can dare offer advice; and this advice is based on an experience of nearly forty years. Build your code of medical ethics on the golden rule and square every action of your professional life by this code. Always try to put yourself in the position of the other doctor. Try to get his viewpoint of you. If you can do this you will get a far truer vision of yourself than you can from your own viewpoint. Then, having gotten this vision, do unto him as you would have him do unto you.

*Read before the Pinellas County Medical Society, St. Petersburg, April 13, 1928.

Medicine as an art has been handed down from generation to generation; and from the very beginning of medicine the importance of medical ethics has been recognized. Medical ethics probably received its first concrete form in the Oath of Hippocrates about 400 B. C. Fundamental morals are contained therein which should be known to every medical student, and lived up to by every practitioner. Let me quote briefly from this document: "I will follow that system of regimen, which according to my ability and judgment, I consider to the benefit of my patients, and abstain from whatever is deleterious and mischievous. I will give no deadly medicine to anyone if asked, or suggest such counsel. I will not give to a woman a pessary to produce abortion. With purity and with holiness, I will pass my life and practice my art. Into whatsoever houses I enter, I will go into them for the benefit of the sick."

What could be finer? Mark you, that was 400 B. C.

In 1792, Thomas Percival, a physician to the Manchester Infirmary in England, wrote a rather elaborate pamphlet on Professional Conduct, which was generally followed in Great Britain, and which was used as a model for the first code of ethics adopted by the American Medical Association shortly after its foundation in 1846. The founder of the Association, Dr. N. S. Davis of Chicago, was one of the committee that wrote this code and signed it as chairman. It was also signed by Austin Flint and several others. This code was modified from time to time to meet changing conditions.

"The Principles of Medical Ethics," as it is called, of the American Medical Association is an admirable short presentation in three chapters: the duties of physicians to their patients; the duties of physicians to each other and to the profession at large; and the duties of the profession to the public.

This is a progressive age with all our environments and opportunities for pushing onward and upward in our profession. No other calling or profession has such a record of constant and unselfish devotion to suffering humanity. The entire pathway of medical research and progress is marked by footprints of martyrs of science in the advancement of medical ethics and ideals. We read that Vesalius in 1514, the noted Belgian anatomist was persecuted and censured because

he dared to study the dead body that he might better know and heal the living.

Jenner, the English physician, in 1796, as you all know, vaccinated a boy from the hand of a dairy maid, then inoculated the same boy to smallpox; the experiment was a success; he was ostracised and pictured as a devil.

Harvey, the famous English physician and physiologist, was described as an infidel because he discovered the circulation of the blood. And so on.

Our call to the service of the healing art is not the call of wealth, power, social ease, comfort, or long life full of restfulness and pleasure. We are enlisted on the side of humanity in its grim struggle with disease and death. If there is anybody in all the wide world, it seems to me, who should have high ideals and an honest heart it is the man of medicine.

Man is never born great except potentially, nor can true greatness be thrust upon him. It can only be obtained by achievement. Medical history has added the names of many illustrious men to her pages, who by persistent, conscientious devotion to service have won their laurels.

From the ranks came Koch, a John Hunter, a Murphy, an Osler, a Binnie, an Oschner and many others.

No doubt each of us have some potential ability stored within us which needs development. Then let us realize at once that we have matriculated for a lifelong course in the university of practical experience, where every patient is a study, where every symptom is to be traced to its origin and weighed as to its significance, where every examination is an exercise of skill, every operation a training in technique and every prescription a drill in sound therapeutic reasoning.

Osler says "the practice of medicine is an art, not a trade; a calling, not a business; a calling in which your heart will be exercised equally with your head." Great things have been accomplished but greater remain to be done. Every discovery in medicine has opened doors of opportunity for the physician for every one it has closed.

Lister developed antiseptic surgery with the result that the world is filled with surgeons. Medicine still has a great field for advancement. Tuberculosis has not surrendered. Cancer still remains. Measles and pertussis are still serious; while mental and nervous diseases, auto-intoxication, pneumonia, cardiac and renal disorders together with many other diseases await elucidation.

The man of widest knowledge in medicine has probably been the everyday doctor in general practice. However, medicine has grown far too great for any one man to cover the entire field and do it well. In our day, too, sad to relate, medical ethics in many instances seem to have fallen by the wayside. Our profession, that according to writers was once honored and respected by all men, and regarded as probably the highest of the learned professions, has fallen from grace.

In England they say doctors, where we say physicians, because they have no osteopaths, naturopaths, chiropractors and various other paths and faddists to assume the title of doctor. Therefore in England the term doctor confers an honor to the one addressed or spoken of, because it always means doctor of medicine.

A recent writer states that he is fearful that in some instances our noble calling is becoming too much commercialized, which gives more room for quacks and fakirs; and that too generally the profession has become obsessed with the idea of magnitude in practice rather than quality of work, or contributions to professional betterment.

"Big Business" in medicine, like in the commercial and industrial world, may produce a few medical plutocrats, but its tendency will be to lower the general professional tone, and establish false standards of practice. It is not in keeping with the ancient traditions of medicine, nor consonant with the "Principles of Medical Ethics."

Of the scoffers at the tenets of our medical creed none equals in numbers or virulence of accusations, the quasi medical sects, the "rubbers" and "healers." When concerted effort is made by the profession to require of these mushroom practitioners the same fundamental literary and scientific training which accredited physicians must take, they protest furiously, crying persecution and monopoly. Thus have these antimedical agitators and pseudo-practitioners shouted themselves into a position of prominence in the public mind.

So securely established are they that legislatures pay homage in negative action regarding reforms, and because of their substantial contributions to the advertising columns of the lay press, the latter gives them publicity.

Why is it we are compelled to have in existence during any medical era the faddists and the quasi-practitioners mentioned above? Is it because the medical profession is so small, so narrow, so unscientific as to compel the people of our land to seek something that our profession can not give them that these new and unfounded fads come into existence? I believe it is because we are not sufficiently organized, through lack of cooperation, through lack of proper representation and hearing in the legislative halls; and perhaps more largely because the people themselves are in part ignorant, careless or indifferent to their real needs in times of sickness and distress.

It does seem to me that in time the people will become educated to the fact that medicine and surgery are large enough, and progressive enough to meet all the requirements of all ages in which we live. I believe that preventive medicine when thoroughly instilled into the coming generation will be a great means of bringing the physician and people closer together. We will then have more freedom with our clientele and be compelled to recognize better ethics and higher ideals.

The "Principles of Medical Ethics" represents a most commendable effort on the part of the progressive and intelligent elements of medicine to conserve the idealism of the medical past. It seeks to elevate the standards of practice and scientific attainments, of gentlemanly and moral conduct, for the benefit of the patient first of all; for the mutual instruction and elevation of the profession; and in the interest of the public weal.

Should we ever fall from these high standards we will no longer be worthy the designation of a profession but must march in the ranks of tradesmen.

Emerson has said, "Possibly the most essential asset in life is character, the acceptance of a moral code to guide our actions." I believe this; and I believe that it applies to us, both as individuals, and collectively as a medical society.

Today we must not only go back to Hippocrates, but also adopt and teach a code based on the conditions and needs of modern scientific medicine. The world, as a whole, pays too little respect and attention to sound general ethics. We in medicine are scientists, and as such have learned to bow down before the immutable laws which control the universe. We strive to learn the laws of life and seek to obey them for our own good.

Science, as well as religion teaches us the great value of a moral code. Both teach the simple lesson of the Golden Rule.

To no group of men are sound ethics so important as to medical men.

To us they must be a religion, the controlling influence of our lives.

THE INTRACAPSULAR METHOD OF CATARACT EXTRACTION—WITH REPORT OF CASES*

WILLIAM B. HOPKINS, M.D.,
and
WILLIAM PATTERSON, M.D.,
Tampa.

When one considers the mass of literature on cataract extraction there is little wonder that, aside from the ophthalmologists, there are so few, even in the profession, that grasp the cardinal principles of cataract operation. The object of this paper is to bring before you some of the advantages of the intracapsular method of cataract extraction.

Cataract operation has been performed for over a thousand years. Prior to Daviel, however, the operation consisted of introducing a needle, or a thorn, and pushing the opaque lens from before the pupil, an operation still in vogue in some remote parts of India, which, with all its crudeness, achieves a sufficient degree of success to keep it from finally dying out.

In 1745, Daviel introduced a new era into cataract surgery by taking the lens substance out of the eye, leaving, however, the capsule behind.

The greatest advance in cataract operation, in our opinion, was done by Smith of India, when he began about 23 years ago removing both lens substance and lens capsule en masse.

The lens itself is composed of three elements, namely: the capsule, cortex and nucleus. This division of the lens into substance and capsule is the basis of the two types of cataract operation in vogue today. In one type, the older one, the operation consists of rupturing the capsule, and removing the contained lens substance, but leaving the capsule in the eye. In the other, the one perfected by Smith, both lens substance and lens capsule are removed en masse, without so much as breaking the capsule.

When a new method of doing things, either in medicine or surgery, is introduced, often it is too long before the profession discovers the advan-

*Read before the Florida Midland Medical Society, Bradenton, May 4, 1927.

tages of the new method. The intracapsular method of cataract operation has had its share of adverse criticism, and on this account today is not universally done by all ophthalmic surgeons. However, Col. Smith says: "This method has come to live and dominate its opponent in the whole East and in my opinion will come to be the operation the world over 20 years hence."

From a theoretical standpoint, every advantage is with the intracapsular method, for in this operation there is no capsule left behind to invite inflammation immediately following the operation, and to develop secondary cataract later. On this point Fuchs, whose text-book is the ophthalmological Bible of over half the world, says: "The ideal cataract operation would be to remove the lens in the closed capsule, (and that is just what the Smith operation does), so that no residue of the cataract would remain, no tags of capsule could be incarcerated in the wound, and no after-cataract could be formed by thickening and folding of the capsule that has been left behind." Again, Dr. Herman Knapp, whose name ophthalmologists all over the world revere, wrote Smith: "If you can devise a method to extract cataract in the capsule, you will be a greater benefactor to mankind than Daviel. If I were not over 70 years of age, and in delicate health, I would go round the world to see how to do it."

From a practical standpoint it has to be admitted that the intracapsular operation requires more skill on the part of the operator; and it requires a skilled assistant, which the other does not. But with that greater skill comes closer approximation to the ideal operation.

Some of the advantages of the closed capsule method are: first, it can be done while the cataract is in any stage of maturity, while the other method requires months or years of ripening and the patient waits round in a state of progressing blindness and helplessness. Second, some fifty percent of the old capsular operations, subsequently develop secondary cataract, which involves another operation, with its attendant risks and inconvenience. In the third place there is much greater tendency to inflammation and iritis immediately following the operation in which the torn and ragged capsule is left behind, than in the clean intracapsular operation.

The charge is made that there is a greater tendency to loss of vitreous in the Smith operation, which is probably true, but that is not a serious objection to the operation unless the vitreous be lost in fatal quantity, which rarely occurs. Smith thinks that a third of the vitreous can be lost and good vision still be achieved. Be that as it may, there is seldom anything like that loss sustained, so that, upon the whole, it may be said that the intracapsular operation not only fulfills the ideal, but that in actual practice it is a good practical procedure, wisely resorted to by the skilled operator and equally skilled assistant, and just as wisely eschewed by the inexperienced.

In our own experience, since learning to do the intracapsular operation, we have rarely resorted to the capsular method without afterwards regretting that we did not choose the former. We believe that the many advantages offered by this operation will make it the accepted operation of the future.

The technic that we employ was described in a previous paper as follows:

We do not use a speculum at any stage of the operation. The assistant, upon whose skill depends a great degree of the success of the operation, holds the lids apart with his fingers. With a pair of toothed forceps the conjunctiva is grasped in the vertical meridian, at the lower limbus, pulling gently forward and downward, care being taken not to press upon the ball.

The puncture, and counter-puncture are made with the Graefe knife, at the horizontal meridian and the corneal section is completed without pausing. A conjunctival flap is made at the finish.

The grasping forceps are now laid aside and, with the iridectomy forceps, the iris is caught and the iridectomy made.

The patient is now directed to look up, and the operator, with a blunt hook, presses directly backward on the cornea, below the horizontal diameter, until the lens leaves the hyaloid fossa. The hook then follows up the lens, directing the pressure so as to tilt the lens upward and forward until it is finally expelled.

The iris is then replaced at the angles of the wound.

We bandage both eyes and do not remove the dressing for three days.

We have selected from our operations a few cases of the various types usually met with.

Report of Cases

Case 1.—January, 1924. R. T. L., male, age 52. Left eye injured fifteen years ago. Vision, count fingers at eighteen inches. First noticed cataract developing in the right eye six years ago;

he had not been able to work for months, waiting for the cataract to mature. We did an intracapsular operation without complications. When refracted six weeks later he got 20/20 vision.

Case 2.—January, 1924. H. R. K., male, 39. Mature cataract in right eye; light perception but not projection; left eye highly myopic; vision 20/100 with corrections. We did not expect to get useful vision in cataract eye after operation, but patient wanted it removed for the cosmetic effect. We removed the lens in its capsule. The eye healed nicely, but post-operative examination of the fundus showed old changes which prevented useful vision.

Case 3.—February, 1924. C. G., Female, age 64. Immature cataract in each eye; still able to count fingers at eighteen inches. Intracapsular operation on right eye; no complication; pretty eye from operation but an old fundus lesion, which was no fault of the operation, prevented normal vision. She got useful vision, however, and was happy.

Case 4.—August, 1924. J. R. J., female, age 52. Mature cataract in left eye; immature cataract in right eye. Patient very nervous. She had twice been in an asylum. During the operation she was fractious and there was some loss of vitreous. She was unruly after the operation and could not be kept quiet. The third day she had a hemorrhage into the anterior chamber. This patient has since died, but before her death the hemorrhage had about cleared up. The last report we had she was able to read large print and the eye was improving.

Case 5.—February, 1925. E. L., female, age 50. Mature cataract in right eye; incipient cataract in left eye. Intracapsular operation performed; there was no loss of vitreous; or post-operative trouble. She obtained normal vision.

Case 6.—March, 1925. L. C. J., female, age 89. In spite of her age and feeble condition, we did an intracapsular operation on right eye. We have just received a report on this patient. She says that she is able to read fine print, and thread a needle.

If we had done the capsular operation on this old lady and it had required an after-cataract operation, we are sure that she would not have returned for the second operation, as it required some persuasion, on account of her age, to get her consent for the first.

Case 7.—May, 1925. H. A., female, age 80. Hypermature cataract in left eye. Intracapsular operation was attempted, but the cataract was large and soft. The corneal incision being too small, the capsule ruptured when it was part way through the incision and we were unable to remove the entire capsule, thus making this a capsular operation, and an operation for the after-cataract is now necessary.

This patient does not understand why she had to have another operation, but in a large percent of the cases a second operation, after the old capsule method, has to be done.

Case 8.—June, 1925. A. C. G., male, age 48. Immature cataract in right eye; mature cataract in left eye. Intracapsular operation, during which we estimate that at least one-fourth of the vitreous was lost. In spite of this, this man gets 20/20 vision and is using the eye altogether in his work.

It is doubtful with this amount of vitreous lost, if we had left behind the capsule and some lens substance to stir up inflammation, whether the patient would have gotten 20/20 vision.

Case 9.—January, 1927. P. W. H., male, age 61. Black cataract in each eye. Says that he has not been able to see with left eye for 10 years. He has a marked ectropion of the lower lids and an old chronic skin disease, which made the cataract operation a bad risk. We did the intracapsular operation on the left eye, with good results. He now gets 20/40 vision which we think will improve very much.

CONSERVATIVE TREATMENT OF GONORRHEA*

J. Frank Cranford, M.D.,
St. Petersburg.

Before discussing this subject I am going to give you a few figures with which you may or may not be familiar.

First, that the number of cases of gonorrhea is not on the decline but even after all the work done in this line during the World War it is steadily increasing. It is first in prevalence in the U. S. Army and stands fourth in the cause of permanent discharge.

It is estimated that from 85 to 95% of all men living in cities have at some time during their lives contracted the disease. Also that 20% of all married men contract it and that 45% of these infect their wives.

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*Read before Pinellas County Medical Society, St. Petersburg, Feb. 22, 1929.

It is estimated that 60 to 80% of all operations upon the female organs of generation are for lesions caused by gonorrhea, this to say nothing of the thousands who never come to operation but lead lives of semi-invalidism through the ravages of the gonococcus.

Physicians who do not see a great many cases of gonorrhea in the female may have an idea that it is a simple disease, comparing it to a few cases seen in the male; however, there are gynecologists of wide experience who believe that gonorrhea in the female is rarely cured.

Dr. Ricord has said "A gonorrhea begins, but God alone knows when it ends." It is estimated that there are 6,000,000 cases of blindness in the world, 1,500,000 being caused by gonorrhea.

As to the positive cure in the male we can sometimes say, but when the woman is cured it is almost impossible to say. I am going to limit my suggestions to treatment of the male. It has been said that should our forefathers who were physicians return they would feel perfectly at home in the general treatment of gonorrhea. I believe that one of our greatest drawbacks to intelligent treatment is gotten from some of our modern text-books, in that they lead you to believe that an uncomplicated case should be cured in two or three weeks. Dr. Corbus insists that gonococci can not live but a few minutes at a temperature of 113 degrees F.; he also states that he has seen numerous cases cured when the patient had a temperature of 102 F. for several hours.

Dr. Pelouse has shown that the germs will survive after 30 minutes at 113 degrees; also they will live after being submerged in ice for 24 hours. I cannot imagine a nicer treatment than to introduce a heated sound, increase the heat to 113 degrees, leave it in place for thirty minutes, have the patient return next day, repeat the treatment and feel assured that the patient is cured, but such is not the case.

Dr. Cabot, after naming nine different drugs, lays stress on the value of acriflavin 1-4000 or 5000, to be used by the patient as an irrigation. He states that in 50% of cases seen within four or five days after the discharge has started, you should expect a cure within two weeks. Dr. Valantine reports numbers of cases cured within two weeks with irrigations of potassium permanganate; however, he does not say how many were not cured in 4, 6, 8, or 10 weeks.

Dr. Young reports the cure of many cases after one or two intravenous injections of mercurochrome, 1% solution, 5 to 25 c.c. doses. His tabulation shows that of 26 cases so treated 20 were cured. He also tabulates 5 cases of gonorrheal arthritis treated in the same manner with 100% cures. This would lead you to believe that mercurochrome was almost a specific for gonorrhea.

Dr. Keyes suggests the use of acriflavin 1-5000 to be used only by the physician as it can do great damage even in comparatively weak solutions, and after naming six or eight drugs does not claim either to be outstanding as a cure.

You will see that the men who are considered authorities on this subject are constantly contradicting each other, thereby causing confusion. After reviewing quite a number of books on this subject I believe that there is one condition which does more to retard the cure and produces more complications than any other, and that is TRAUMA, either physical or chemical.

It is estimated that perhaps 90% of the cases in this country are treated by the general practitioner, who will readily admit that he knows very little about the disease, and many of our distinguished urologists who are doing much surgery and research work pass up gonorrhea.

The methods of treatment at the present time consist of two extremes: first, by oral medication, the physicians using this treatment evidently thinking that gonorrhea is a self-limited disease, knowing full well that any medicine given internally is not capable of destroying the gonococci while being expelled through the urethra; second, in this class are those who believe in the direct application of drugs strong enough to kill the gonococci, forgetting that these germs burrow below the surface and in order to reach them the mucous lining of the urethra must be destroyed.

In search for the best method of treatment we must not follow either of these extremes. However, I believe should I choose one it would be the oral medication with great quantities of water, knowing full well that with cooperation from the patient I had not caused any of the severe complications resulting from the improper use of or too strong medication.

In order to intelligently treat a given case of gonorrhea we must first get the full cooperation of the patient and impress on him the importance of gentleness in treatment and to avoid sexual

excitement, over-exertion, strenuous exercise and alcohol. Explain to him the specific location of the lesions and that any treatment must be directed only to this location. Explain the importance of drinking quantities of water and see that there is free drainage from the urethra. Should a pledget of cotton be used to protect the clothing, impress the importance of changing this cotton at each act of urination.

Now as to the local treatment, it seems that most authorities, after naming numerous drugs, come back to potassium permanganate. Just how this exerts its beneficial action is not clearly known. Next in favor comes the silver salts, remembering that any solution which causes a pronounced burning is perhaps doing more harm than good. Most physicians in their eagerness to get an early cure use this class of drugs in too concentrated solutions.

Any pronounced astringent is absolutely contraindicated, especially in acute or sub-acute cases. Large doses of vaccine in acute or sub-acute cases is condemned by most authorities.

I am not going to discuss the treatment of any of the many complications of gonorrhea, except the acute anterior and posterior conditions. When the patient presents himself for examination, after going into the history, make careful examination of the penis, as to abrasions, swelling and edema. After cleansing the glands and meatus and having made smears, have him pass his urine in three glasses. This is, I believe, the best way to determine the location of the lesions. Should the lesion be located in the anterior portion then all medication should be limited to these parts. I have obtained best results from the following treatment: after instructing the patient as to gentleness and drinking great quantities of water, irrigate the anterior portion of the urethra with 1-8000 solution of potassium permanganate, at about 105 or 110 degrees, having solution about 18 inches above level of his bladder, allowing solution to run in and out under very little pressure. This gets rid of or cuts away any mucous and pus that may be in the anterior urethra. After this is done, inject about 10 c.c. of 5% solution of freshly prepared neo-silvol or argyrol, holding this in place for five minutes. This treatment is to be given morning and evening. As the discharge diminishes, increase the strength of medicine potassium permanganate 1-5000, neo-silvol or argyrol to 10% and see the patient once a day. If still further improvement follows, see him every other or third day, having instructed him in the proper use of the medicine. Should the discharge become thin and of small amount, substitute protargol ¼% solution in place of neo-silvol or argyrol, using the potassium permanganate as before. When the discharge shows only the morning drop, increase the protargol to ½% solution. Usually the discharge will be gone within six or eight weeks and the complications are reduced to a minimum, after which sounds may be passed to see that there are no strictures. Should the posterior urethra become involved (which is shown by the three-glass test and symptoms), all local treatment should be omitted and oral medication of sedatives and large quantities of water instituted. After the acute symptoms subside we can then proceed with posterior irrigations of potassium permanganate, 1-8000, this to be done each day, having the irrigator not more than three feet above level of the bladder. After each treatment with irrigations about ½ ounce of 10% solution of neo-silvol or argyrol is introduced into the bladder (glass syringe with rubber bulb being used for this) and left there for an hour.

As the condition improves increase the potassium permanganate to 1-5000. In course of time the discharge disappears and then a few gentle massages of prostate are given. Should the secretions show no gonococci, gently pass a few sounds to determine if there are any strictures or latent infection.

It has been said that the ten most common drawbacks to the treatment of gonorrhea are:

(1) Faulty knowledge regarding the disease.

(2) Lack of uniform ideas regarding the treatment.

(3) The ready acceptance of a chemical that is capable of killing gonococci.

(4) Little regard for the patient's own part in the cure.

(5) Giving instructions to the patient as to the mode of treatment that he cannot carry out.

(6) Inability to follow the course of the disease.

(7) Common neglect in real diagnosis.

(8) The use of diagnostic procedures at a time when they do great harm.

(9) The lack of effort to prove that the disease is really cured.

(10) The most unfortunate lack of real interest in the disease.

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CRIPPLED CHILDREN'S ACT

An act was passed by the last State Legislature authorizing an appropriation of $50,000.00 per annum to be used in the care and treatment of the indigent crippled children of this state. The money is to be expended under the direction of a commission of five citizens appointed by the Governor. This commission has the power of selecting suitably equipped and located hospitals and properly trained surgeons for treating the crippled children in the various sections of the state.

The bill authorizes the Probation Officer or the County Judge to pass upon the eligibility of any child for treatment by the state. Children of average mentality not over sixteen years of age, white or black, are eligible for treatment under this act.

The bill was sponsored by the Florida Department of the American Legion. It was passed

with remarkably little opposition in either house and has been signed by the Governor. Up to date the commission has not been appointed; therefore, nothing has been done as yet. It is hoped that the finances of the state will be in condition to warrant the beginning of this work in the near future. Until then the State Board of Health will continue to treat as many of the crippled children of the state as their limited funds will permit. It is estimated that there are some two to three thousand crippled children in this state who could be totally or partially rehabilitated. There is a constant waiting list of those anxious for treatment which the state is not yet able to provide.

MORBIDITY IN THE RECENT INFLUENZA EPIDEMIC

The United States Public Health Service has recently announced the results of surveys in certain cities concerning the influenza epidemic of 1928-29. Although full analysis of the data collected will require considerable time, some preliminary tabulations have been made which suffice to show approximately the gross morbidity rates in the several localities studied.

Because of the almost prohibitive difficulties and expense of canvassing rural communities, the surveys were limited to large cities; and these were chosen with a view to representing as many sections of the United States as practicable. Those selected were as follows: San Francisco and Seattle, on the Pacific Coast; Des Moines, Kansas City (Mo.), Cincinnati, and Pittsburgh, representing the Middle West; New Orleans, as a southern city; and in the northeast, Baltimore, Syracuse, and Boston. It was later found practicable to add a single small city, Farmington, Mo.

In order to afford sufficient numbers for a statistical analysis, the sample canvassed in each locality (except Farmington) comprised not less than 10,000 persons, and in cities of more than 400,000 inhabitants, this number was increased to 15,000 or more. To secure a representative sample a total of 12 to 20 districts were marked off in each city, and in each of these districts a systematic house-to-house canvass was made.

It is fully recognized, however, that all records are subject to certain obvious but practically inevitable errors, due principally to lack of definitive criteria for the diagnosis of influenza, and to lapses of memory on the part of the householders from whom the information was obtained. These causes tend, respectively, to uncertainty in the diagnostic classification of reported cases, and to omission of a certain proportion of cases, especially those which were not of sufficient severity to leave a lasting impression upon the memory.

As regards diagnostic classification of cases, enumerators were instructed to inquire concerning the occurrence of "influenza," "grippe," "pneumonia," or "colds," and to record for each case the diagnosis given by the householder. Presumably all the cases reported as pneumonia had been so diagnosed by attending physicians; and a preliminary check of the records indicates that this was true also in a large proportion of the cases classed as "influenza" or "grippe." Also it is probable that the cases so diagnosed were usually of sufficient severity to be remembered by the householders and reported to the enumerators. Therefore, with full recognition of all the probable sources of error in reporting, it is believed that the records as to these classes of cases have a fairly definite qualitative and quantitative significance.

On the other hand, a large majority of the cases reported as "colds" had not been attended by physicians; and it is well known that ordinary colds are likely to be forgotten within a few weeks. Hence, it may be inferred that the record of colds is far from complete, and that it probably includes cases of more or less heterogeneous type.

The total number of cases of influenza and grippe, pneumonia, and colds per 100 persons canvassed for the several States, was as follows: San Francisco 34.1; Seattle 30.9; Kansas City, (Mo.) 27.1; Farmington, Mo., 37.7; Des Moines 47.1; New Orleans 29.6; Cincinnati 27.0; Pittsburgh 25.2; Baltimore 15.1 (exclusive of colds not confining the patient to bed); Syracuse 26.8; Boston 23.5.

The average of all these localities except Baltimore was 29.7 cases of influenza, grippe, pneumonia and colds per 100 persons canvassed. Nearly 15 per cent of the population canvassed in all localities surveyed in 1929 gave a history of having suffered attacks of influenza or grippe, while 0.47 per cent gave a history of pneumonia and an additional 14 per cent reported "colds" which may or may not have been directly related to the epidemic.

The incidence of pneumonia is shown to be about one-third as high in the epidemic of 1928-

29 as in that of 1918. It is probable that the disparity between the two epidemics is greater than these figures would seem to indicate since the periods covered by the 1928-29 record are generally longer than those covered in 1918. Moreover the 1918 epidemic occurred at a season when the prevalence of pneumonia is normally rather low, whereas the recent epidemic occurred at a season when the prevalence of pneumonia is normally rather high and increasing. Mortality records indicate a much greater disparity between the 1918 and the 1928-29 epidemics; apparently the cases in the latter epidemic were of a much milder type.

STATE NEWS ITEMS

Marion County Medical Society is at the present time the largest society to have 100% of membership dues paid for the current year.

* * *

The many friends of Dr. L. M. Anderson of Lake City will be glad to know that he is convalescing after an illness of over five weeks' duration.

* * *

Columbia County Medical Society is again in the 100% paid group. The records in this office show that this is the third consecutive year that Columbia County has been in this class.

* * *

Dr. and Mrs. H. Quillian Jones of Ft. Myers announce the birth of a son, July 4th. The little lad has been named H. Quillian Jones II.

* * *

Dr. Chas. D. Cleghorn announces the removal of his offices from the Ralston Building to Suite 1109 Huntington Building, Miami.

* * *

St. Johns County Medical Society is proud of its record. The dues for all members of this society were paid before March 1st.

* * *

Dr. Franklyn Thorpe of Tampa is spending some time in southern California. From there, he will travel north and return by the way of the northern route. He expects to visit the important clinics en route and return to Tampa after a vacation of two months.

* * *

Dr. John S. McEwan of Orlando, on a vacation trip, recently spent two weeks in Boston attending clinics and visiting old friends. He also spent some time at his old home in Cooperstown, N. Y.

Dr. W. P. Duncan announces the removal of his offices from 201 Krause Building to 401 Tampa Theatre Building, 709 Franklin St., Tampa.

* * *

Taylor County Medical Society has again stepped to the front with 100% of its membership dues paid. Congratulations!

* * *

Dr. and Mrs. E. S. Estes are spending the summer at their attractive beach cottage on St. Augustine beach.

* * *

The Pasco-Hernando-Citrus County Medical Society recently met with Dr. T. F. Jackson, president, at Dade City. Dinner was served at the Osceola Hotel, after which a scientific meeting was held in Dr. Jackson's office. Clinical cases were reported and liberally discussed. Those present were: Drs. Geo. R. Creekmore, L. T. Furlow and Wm. S. Hancock, Jr., Brooksville; Geo. A. Dame and J. F. Miller, Inverness; T. F. Jackson, Dade City; A. B. Cannon, Lacoochee; and J. T. Bradshaw of Lake Jovita.

* * *

Dr. James K. Biddle announces the change of his address from Daytona Beach to Walpark Building, Mansfield, Ohio.

* * *

Monroe County Medical Society has just sent in a check to cover dues for its last delinquent member. This society is now 100% paid.

* * *

Dr. H. Quillian Jones of Ft. Myers announces his association with Dr. J. William Jones; also the removal into larger offices at 18-19-20 Leon Building.

* * *

Dr. and Mrs. J. A. Smith of Homestead left recently for Kansas City, Mo., where they will visit Mrs. Smith's sister.

* * *

Dr. Joel Whitaker announces a change in his address from 905 Congress Building, Miami, to 401 Chamber of Commerce Building, Indianapolis, Indiana.

* * *

Dr. Wm. J. Knauer and family of Jacksonville recently returned from a trip by boat to Canada. They spent some time in Halifax, Quebec and New York where Dr. Knauer visited medical centers.

Madison County Medical Society is one of the "live" medical organizations in this state. 100% of membership dues have been received from this society.

* * *

Dr. Oliver James Hart announces the change of his address from Tampa to the New York Post-Graduate Medical School and Hospital, 301 East 20th St., New York.

* * *

Dr. T. S. Field of Jacksonville left recently for New England. He is making the trip by motor with his family.

* * *

Dr. Ferdinand Richards of Jacksonville has recently returned from Los Angeles where he attended the Shrine Convention. During his visit in Los Angeles, he inspected the hospital for crippled children which is operated by the Shrine.

* * *

Our youngest society, the Washington-Holmes County Medical Society, has come to the fore with 100% of dues paid for 1929.

* * *

The Suwannee River Medical Association met July 22d at Sis Hopkins' Inn, Madison. Dr. Herbert Caldwell presented a paper on "Nephritis". The August meeting of the Suwannee River Medical Society will be held in Live Oak.

* * *

The many friends of Dr. Wm. N. Parkinson, formerly chief surgeon of the Florida East Coast Railway and Hospital, will be interested to know that he has been appointed Dean of the Temple University School of Medicine in Philadelphia.

* * *

The Pasco-Hernando-Citrus County Medical Society has not disappointed us. It is an active organization. Membership dues—100% paid.

* * *

Members of the Dade County Medical Society and their wives enjoyed a banquet at the Miami Country Club July 6th, following which there was a bridge party and dancing. The afternoon preceding the banquet, a handicap golf tournament was enjoyed by the members of the Society.

* * *

Dr. Dana V. Clark, field representative for the American College of Surgeons, is at the present time engaged in surveying the hospitals of the state.

* * *

Dr. J. Knox Simpson of Jacksonville left recently for the north and expects to be gone several weeks, during which time he will visit the Mayo Clinic at Rochester. He will also visit clinics in Chicago and Cleveland.

* * *

The next meeting of the State Board of Medical Examiners of Florida will be held in Miami, November 19th and 20th.

* * *

The Walton-Okaloosa County Medical Society has been 100% paid since last February. However, that is not surprising as this is the third consecutive year that dues from this society have been fully paid before the time of the annual meeting.

* * *

The following item appeared in the June, 1929, Bulletin of the Federation of State Medical Boards of the United States:

"According to the letterhead of a circular letter dated May 1, 1929, sent out by H. M. Harper, M.D., president of the 'Florida Sanatorium,' Tampa, Florida (not listed in the files of the American Medical Association), G. A. Munch, 'M.D.D.' is the chief consulting physician of the institution. Dr. Munch, former secretary of the Florida Eclectic Medical Examining Board, was convicted a second time in the federal court at Tampa, February 16, on the charge of selling fake medical diplomas and licenses and again sentenced to serve five years in a federal penitentiary and pay a fine of $1,000. He was similarly sentenced two years ago. (Bulletin, October, 1926, p. 241; March, 1927, p. 74; April, 1927, p. 104; May, 1928, p. 134; March, 1929, p. 63.) The circular accompanying this letter which was addressed to 'Dear Doctor' contains a discourse on Ec-lec-to-pathy which is 'briefly, a Medical Science that, with its Special Diagnosing system, locates the disease and its causes; which permits DEFINITE and DIRECT treatment with SPECIFIC and SELECTED remedies.' It goes on to say that eclectopathy is so simple that anyone of fair education can in a very few months be skilled in this 'science.' The circular pictures Dr. Munch as a very modest man yet claims that proof can be furnished that he is the best qualified physician, not only in Florida but in the world and gives the impression that he is still practicing in this so-called 'sanatorium.'"

* * *

Our smallest, though not least important, society, the Hamilton County Medical Society, is 100% paid for the current year.

An Institute for Tuberculosis Workers will be conducted at Nashville, Tenn., September 10th through 24th, 1929, under the auspices of Vanderbilt University, in cooperation with the National Tuberculosis Association, the Southern Conference on Tuberculosis, the Tennessee Tuberculosis Association and the Tennessee State Department of Health.

This training course will be conducted by Philip P. Jacobs, Ph.D., Director, Publications and Extension Service of the National Tuberculosis Association. The committee on local arrangements and program includes James P. Kranz, Southern Conference on Tuberculosis; Dr. E. L. Bishop, Tennessee State Department of Health; Dr. W. S. Leathers, Vanderbilt University School of Medicine, and S. L. Smith, Field Worker of the Rosenwald Foundation.

Application for the Institute and further information can be secured from Sherwood H. Smith, Florida Public Health Association, 507 Dyal-Upchurch Building, Jacksonville, Florida.

* * *

Dr. and Mrs. A. C. McKenzie of Jacksonville, during their summer vacation, recently visited Baltimore, New York and Maine.

* * *

Dr. F. L. Fort of Jacksonville was a member of the American crew of 150 orthopedic physicians who attended the joint meeting of the American and British Orthopedic Associations in London in July. While on this trip, Dr. Fort also visited clinics in New York, Liverpool and London.

* * *

Drs. G. F. Oetjen and C. B. Mabry of Jacksonville recently returned from an extended European trip. They first visited Germany and spent some time in Bremen, Hamburg and Berlin. While in Berlin, Dr. Mabry took a short course in gynecology under Dr. Strassmann and Dr. Oetjen a course in urology under Dr. Eugene Joseph of the University of Berlin. They visited the clinics in Vienna and called at the headquarters of the American Medical Association in that city. Later, they visited Paris and other points of interest in France.

Drs. Oetjen and Mabry state that the two things which most impressed them were: (1) the splendid opportunities for American doctors to study in Germany today and (2) the development of air travel in Europe. This is the accepted mode of transportation and most of the trips taken by the doctors were by plane.

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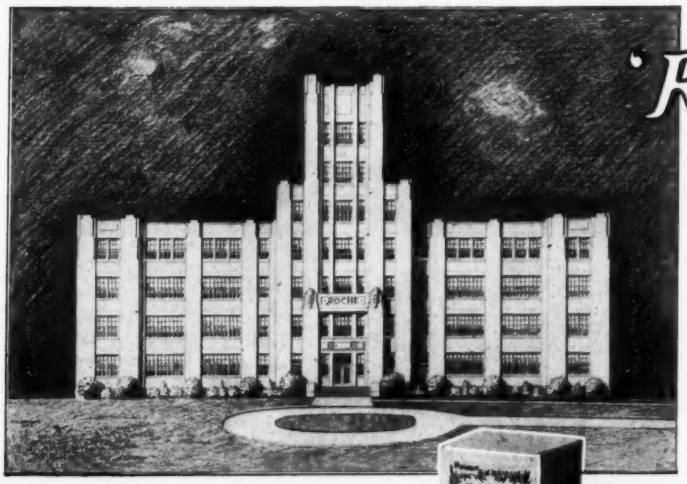

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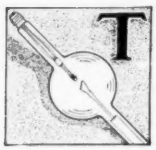
TUBERCULOSIS ABSTRACTS

A REVIEW FOR PHYSICIANS
ISSUED MONTHLY BY THE NATIONAL TUBERCULOSIS ASSOCIATION



THIS number is contributed by Homer L. Sampson, roentgenographer of Trudeau Sanatorium, who speaks with appreciation of the writings of investigators, such as Allen K. Krause, whose researches are shedding light on the evolution of pulmonary tuberculosis from the first invasion of the bacillus to the death of the tissue involved. He looks forward hopefully to the perfection of a method that will reveal the

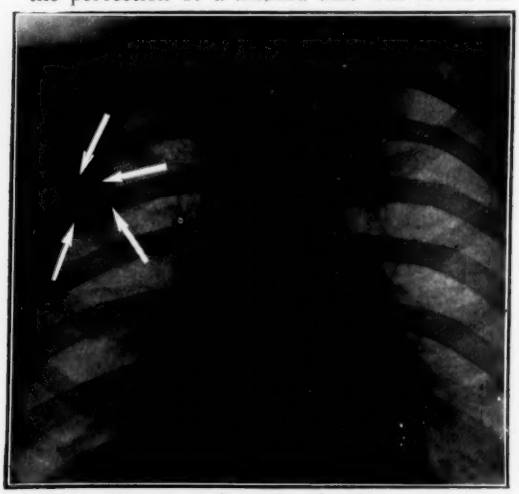


FIG. 1. Film taken prior to the administration of tuberculin, subcutaneously.

early macroscopic changes in the development of pulmonary tuberculosis in the living individual, and submits that at present the only aspirant to that honor is the roentgenograph. At the same time, he warns that the X-ray picture at best is but a link in the chain of evidence and that final conclusions cannot be drawn from it alone.

SERIAL ROENTGENOGRAPHY AND THE EVOLUTION OF PULMONARY TUBERCULOSIS

To allude to the "film" as a "living pathology" may be an exaggeration, but stereoscopic films of the chest may rank as a means of studying living pathology. Before such a goal may be securely established, however, considerable standardization will be necessary. This short resume de-

(*Continued on page* 88)

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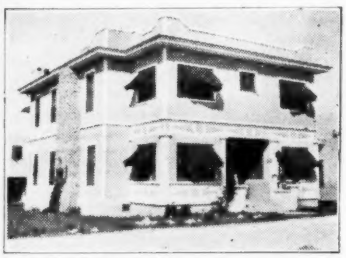

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Two drops equal the *rickets* healing power of one teaspoonful of cod liver oil, and there is no fishy taste or odor. Moreover, infants that could not take enough cod liver oil to induce healing may now obtain the necessary amount of vitamin D by adding a few drops of Acterol to their diet, or giving it by mouth.

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Mothers who formerly objected to cod liver oil, offer no resistance to Acterol.

Mead's Acterol may be obtained at drug stores on prescription, and is sold under license of Wisconsin Alumni Research Foundation.

Suggested Doses: For infants growing at the normal rate, 8 to 10 drops a day.

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scribes a standardized technique that produces satisfactory results for the study of the evolution of pulmonary tuberculosis, together with a few remarks on the uses of such a method.

The X-ray "picture" is a most valuable aid in the diagnosis of pulmonary tuberculosis. The "film" also reveals a variety of shadow combinations in various phases of evolution that go hand in hand with the clinical course of the disease. It is desirable, therefore, that a method be evolved that will enable us correctly to register the various changes that are present in the lung or that may later take place. While the film reveals only shadows, these shadows portray an anatomical or a pathological condition existing in the chest. Yet, we are not to infer from this that the film reveals every anatomical or pathological change in the path of the ray; a small area of disease may be so located as to escape detection, due to the overlying denser tissues—anatomical or pathological. Nor is one always able to determine the character of the structure or outline of a given shadow. Experiments have shown that an object having geometric form may often be seen in a field, whereas one not having a definite shape or outline may be practically lost in the same field. Dr. Kennon Dunham has aptly used the aphorism, "shadows do not lie," but inexperience may make inferences faulty.

MANY ROADS LEAD TO ROME

There are many ways to obtain good films. The one important point is to be sure that the factors involved in the making of a film are as you suppose them to be. Also, it is not of so much importance that a film should be of an exact density as it is that one may be able to reproduce results that are within reasonable limits of density and comparable. The technique now in use at the Trudeau Sanatorium is as follows:

Eastman duplitized films—Eastman developer, 100 M. A. Coolidge Tube—Kelley-Koett Tube and Cassette shifter. Double Intensifying screens. Snook Transformer. Distance 48 inches—milliamperes 100—time 1/15 second. Kilo voltage is variable for different chest depths.

A variety of opinions is held by many leading roentgenographers as to which technique produces the most satisfactory chest film. Two factors of considerable importance are the length of exposure and the tube film distance. With the ever-increasing power of X-ray machines and tube capacity, it is possible to cut the time down

(*Continued on page* 90)

SAFE, SIMPLE INFANT FEEDING

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to 1/120 of a second with the possibility of this being shortened; but the question arises, is there any need of working faster than a speed that is sufficient to arrest satisfactorily the shadows of the moving parts, which can be done in many instances with 1/15 or 1/20 of a second?

SERIAL FILMS ARE VALUABLE

Serial films in the study of the progression or retrogression of the pulmonary disease are valuable. This does not apply alone to pulmonary tuberculosis; but as pulmonary tuberculosis is so often a chronic process, it is not strange that investigators wax enthusiastic when they find how often the progress of the disease can be followed and how frequently the various changes that take place in the lungs fit in so nicely with the clinical or symptomatic behavior of the patient. At the Trudeau Sanatorium for the past ten years, the evolution of pulmonary tuberculosis in upwards of 3,000 patients has been followed over the usual period of residence at the Sanatorium. In many instances, the serial work has been carried on for years after discharge from the institution.

Early infiltrations have been followed through the various intermediate steps or phases until apparently a complete resolution or, as is more often the case, organized fibrosis takes place months or years later. Many collateral inflammatory reactions or new foci, as the result of repeated exacerbations, have been seen to develop in the course of the disease. These also can be seen to resolve or progress as the case may be. While many early changes can be recorded on the stereographic films, it is not to be inferred that the film is capable of registering the earliest tubercle formation. However, through experimental work instituted by Dr. Lawrason Brown and carried on at the Trudeau Sanatorium, we were able to demonstrate roentgenographically tubercles in the lungs of rabbits fifteen days after inhalation of bacilli.

SHADOWS OF EARLY LESIONS

How long might the disease have existed before it registered on the films? There is no doubt but that the first proliferation of cells incident to the presence of bacilli might easily fail to register a sufficient shadow to be recognized. This condition may occasionally be inferred when rales develop in an area where before there were none and when subsequently shadows appear in the film at this site. Cavity formation has been ob-

(*Continued on page* 92)

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It has been proved by research (and the fact is widely recognized by the medical profession) that the addition of 1% of Knox Sparkling Gelatine dissolved and added to the milk will largely prevent curdling in the stomach and thus greatly increase the nourishment derived from the milk.

There is nothing in pure gelatine that will in any way be injurious to any baby either sick or well. But precaution should be taken to use only the purest of gelatine. Knox Sparkling Gelatine has been the accepted standard for nearly forty years. It has the same neutrality as milk—is an excellent protein, unflavored, unsweetened, unbleached. Specify Knox, the *real* gelatine, when you prescribe gelatine.

The following is the formula prescribed by authorities in infant feeding: Soak, for about ten minutes, one level tablespoonful of Knox Sparkling Gelatine in one-half cup of milk taken from the baby's formula; cover while soaking; then place the cup in boiling water, stirring until gelatine is fully dissolved; add this dissolved gelatine to the quart of cold milk or regular formula.

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served from incipiency through the subsequent progressive stages until in some instances a whole lobe is excavated. In many of these cases, there is observed a zone of localized haziness surrounding the cavity wall.

Again may be observed the progression of cavity formation to the phase where it may cease to grow, followed by a slow or rapid dissolution of the so-called ring or annular shadow or area of rarefaction, until little or no trace is left of the previously present cavity.

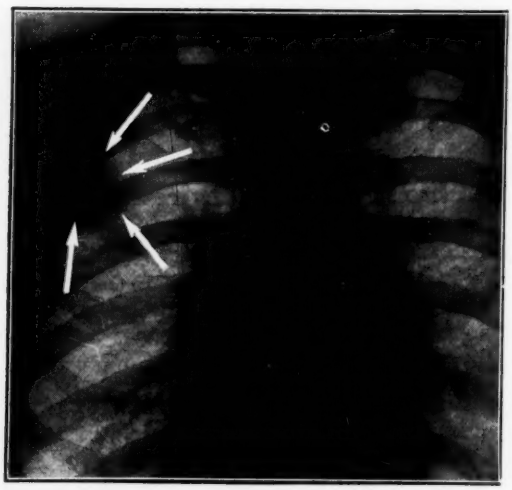

FIG. 2. Film taken during the height of tuberculin reaction. Note increase of area of cloudiness.

Very recently, serial films of certain cases have been taken as often as twice a week. In such instances, where specific foci are being watched, it has been possible to record very small changes taking place from time to time. The progression or retrogression of small cavities can be measured almost in millimeters. Where only one limited field is being studied, small stereoscopic or single films, size 5x7 inches or 6½x8½ inches, can be utilized to great advantage.

In a patient manifesting definite symptoms, the physician is enabled often to direct his attention to other organs when serial films exclude the lungs as being the seat of trouble.

The advantage of serial studies is evident only after rigid standards are followed and checked up with the clinical and laboratory data at hand. Then the study of the pulmonary disease offers many avenues of interesting and instructive investigation.

(This review secured by the Florida Public Health Association from the National Tuberculosis Association.)

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